Reagentless Optical Sensor for Measuring Biomolecules in Interstitial Fluid

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Technology description

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Researchers at the University of Iowa have developed a device for the accurate measurement of analytes in a biological or non-biological solution. This device, which could be implanted, is an optical sampling cell that contains a electromagnetic radiation source and a microspectrometer. The microspectrometer collects one or more parameters of the analyte in the infrared spectrum and reports the concentration data for this analyte in real-time. Because this device uses light absorption data for the analyte, it requires no additional reagents for analyte determination and thus provides continuous data without any recycling of components.

Background

The accurate, reproducible, real-time measurement of specific analytes present in biological fluids would provide physicians with the most-relevant and useful information on which to base treatment decisions. This type of analysis would prove particularly valuable for the measurement of glucose, important in diabetes maintenance, but could also be applied to other physiologically-relevant compounds, such as urea, lactate, triglycerides, cholesterol, etc.

Advantages

REAGENTLESS. The optical-based measurement allows data to be gathered in the absence of additional reagents. This decreases the size and cost of the device and increases its useful life.
CONTINUOUS MEASUREMENT. The data provided by this device is uninterrupted and updated immediately, providing the most relevant information of medical and other applications.
IMPLANTABLE. This device is constructed in such a manner that its size and lifespan for effective measurement allow the device to be implanted in patients or situated in difficult to access industrial sites. In addition, the analyte information can be transferred wirelessly thus simplifying the data-gathering process.
INFRARED ABSORPTION-BASED DETECTION. The measurement is based on infrared absorption spectra, which provide several absorption data points confirming the analyte-specificity of the signal.

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